
Integrated Energy Planning



A Fence to Fence Approach

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Why Plan for Energy

- Issues are interdisciplinary
- Integration a requirement in today's world
- Energy managers may will soon find themselves in over their heads, if not already
 - too may hats
 - rapid technology change
 - paradigms are shifting on many fronts
 - sustainability takes a holistic approach



Drivers for Integrated Energy Planning

- New Executive Order on Energy
- Sustainability and productivity issues
- Funds drying up (ECIP and FEMP)
- Ad hoc, bottom up program cannot be managed effectively
- Three waves underway - Electrical and Gas Market transformation/Energy technology revolution/Privatization
- Comprehensive approaches required



New Policy EO 13123 (6/4/99)

- 35% energy reduction by 2010 (1985 base)
- 30% carbon reduction by 2010 (1990 base)
- Energy Star Building Targets
- Greater use of renewables (on & off-site)
- Sustainable building design and development
- Source energy resource and pollution issues
- Greater emphasis on ESPCs (other people's money)



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Sustainability Issues

- Sustainability of the built and natural environments is the enduring issue for the 21st century:
 - ACSIM policy statement on sustainability
 - Draft AR 5-XX “The Sustainable Army”
 - Greening of the Government Executive Orders (4)
- Sustainable development requires a new paradigm for installation planning and landuse:
 - We can no longer mimic the practices we see outside the fence (sprawl & inefficient buildings)
 - Smart development, green buildings, and environmental cost accounting all coming

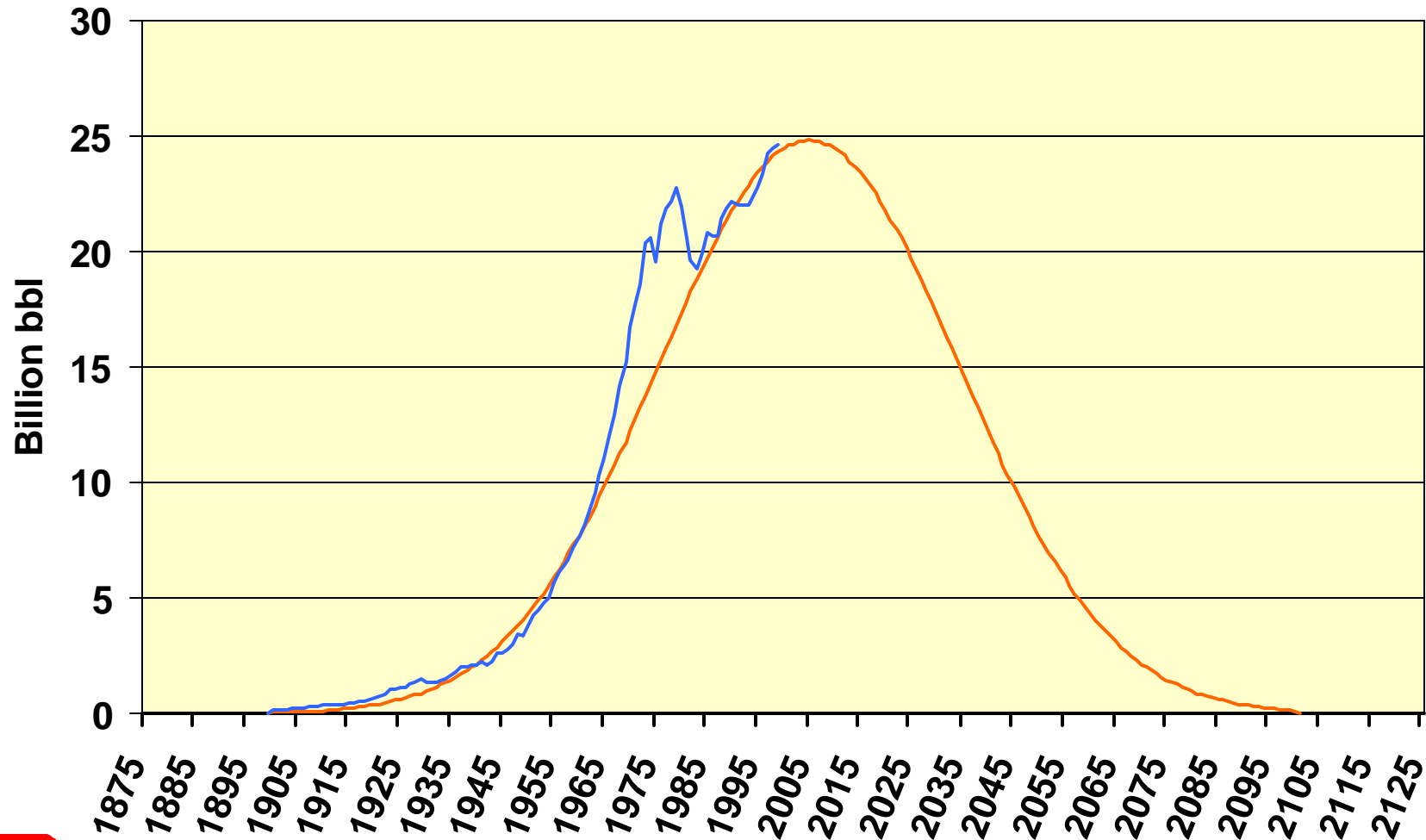


Productivity Issues

- Productivity of workers is paramount
 - The Army has to be profoundly more productive
 - Workforce costs >\$200/sf
- The principles of smart development are also principles of productive development
- Green buildings and green development lead to enhanced community satisfaction and enhanced sense of place
 - Satisfaction leads to enhanced retention
 - Satisfaction leads to greater productivity



World Oil Production



Source: *Worldwatch Institute Database, Jan 99*



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Riding the Waves

- Electrical and gas market transformation coming:
 - progress is sporadic at best
 - the grid may not be a reliable source in the future
 - we have a changing business paradigm
- Energy technology in rapid change
 - renewables
 - cogeneration
- Privatization Initiatives



1st Wave - Market Transformation

- True competition in electricity will begin in earnest in 4-8 years after deregulation (state dependent)
- Once competition comes, so do changes:
 - Large customers go with nation-wide contracts
 - Drop in electrical prices may not be realized
 - Integrated solutions will be sought
- The power companies must change or be replaced by competitors (mergers will dominate)
- DoD installations with large thermal loads are a viable market for cogen and distributed generation



2nd Wave - Technology Revolution

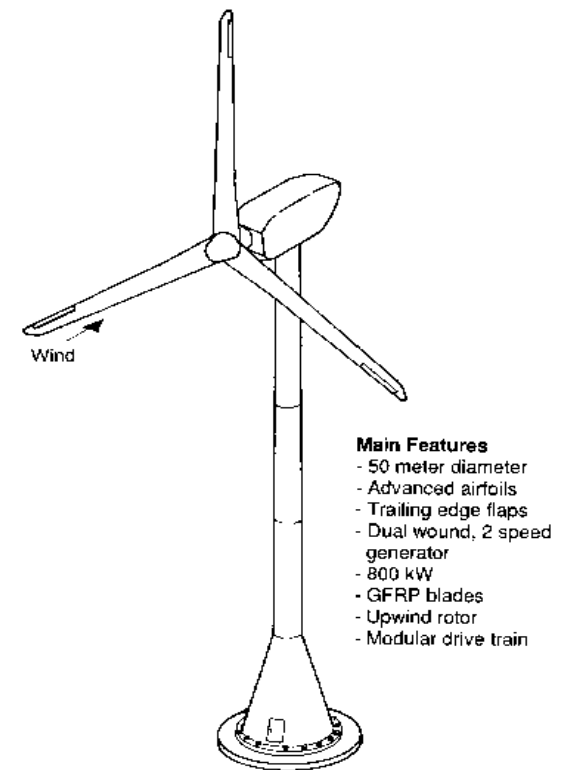
- Renewables now competitive:

- Wind
- Solar Thermal
- Geothermal Heat Pumps
- Micro climate/heat island amelioration
- Others coming (PV)

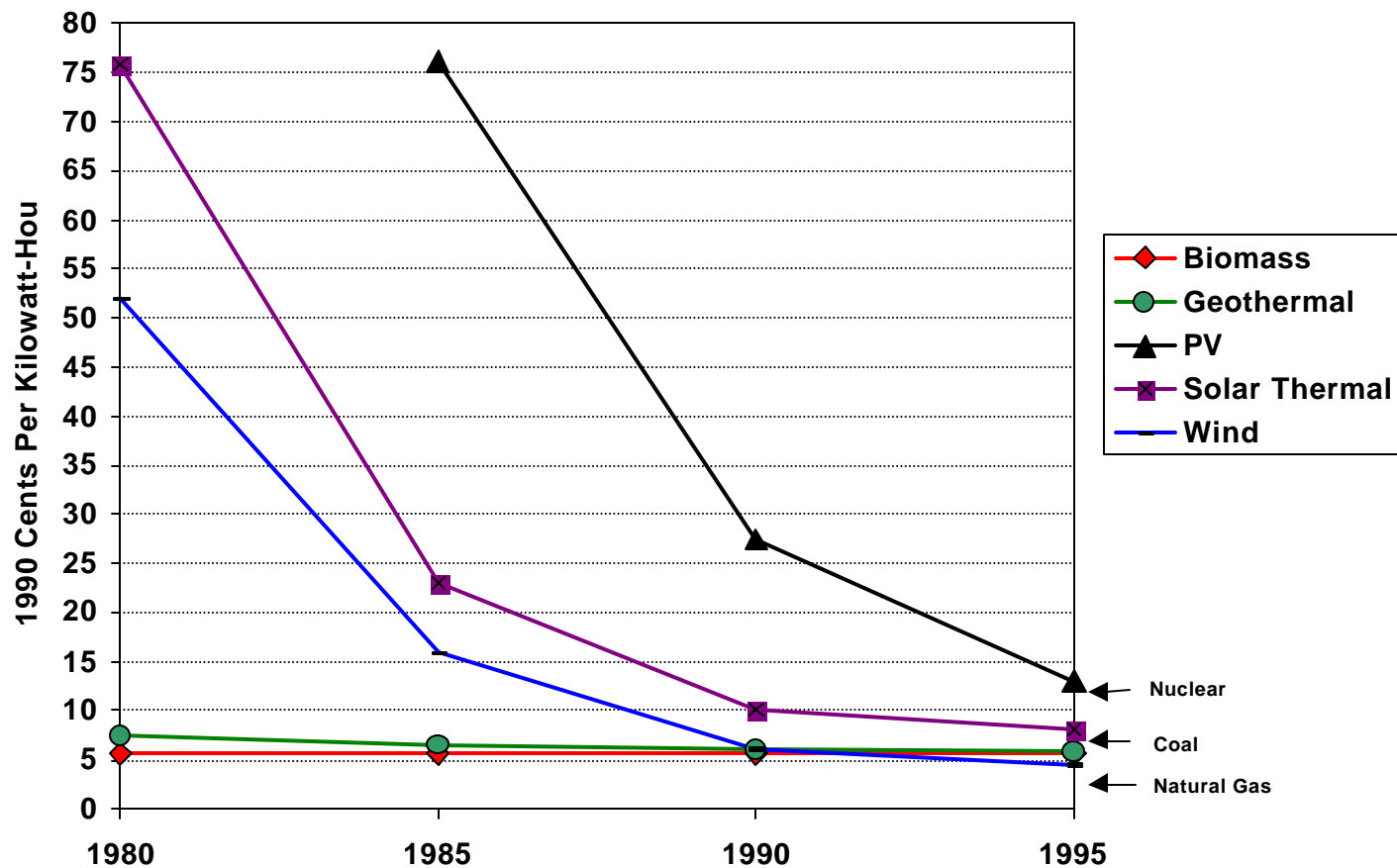
- Distributed generation

- Microturbines/Fuel Cells
- Co- and Tri-generation

Advanced Three-Blade Turbine



Renewable Energy Costs Are Dropping



Source: The Energy Foundation, 1996



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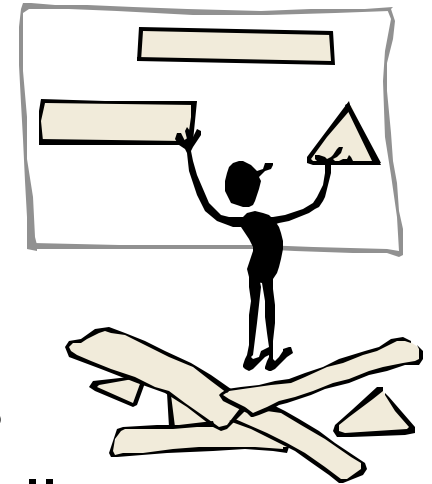
3rd Wave - Privatization

- Systems must be privatized by 2003
- A significant portion of systems will not be privatized and even when privatized, we must ensure reliability and efficiency
- There are private firms out there willing to do it all:
 - Take ownership of utility systems
 - Supply energy commodities
 - Take over building systems and optimize systems while providing heating, lighting, cooling, ventilation, water, etc



Opportunities for the 21st Century

- Enduring issues:
 - Lack of project money
 - Buildings and internal systems
 - Legacy utilities and Central Energy Plants
- Technology infusion is required (fuel cells, natural gas, renewables, thermal storage, cogen, lighting, recommissioning)
- Sustainability of the built environment added to mix



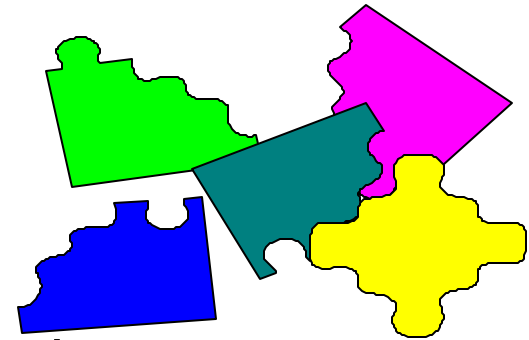
Integrated Energy Planning - Background

- Army energy program needs a holistic approach - new environmental emphasis
- Installations need to cope with many options and programs to get with job done (technology, privatization, & market transformation)
- Need a method to pick optimum path without stepping into pitfalls
- Need to instill vision and discipline into the energy management process - holistic with overall installation management



Integrated Energy Planning - Approach

- Integrated Planning Methodology:
 - 10 year planning horizon
 - Review past efforts and progress
 - Determine current guidance and practices
 - Apply tools and determine technical opportunities based on technology templates and analysis models
 - Define implementation fiscal options, economic evaluations, and optimize strategy
 - Develop plan and Measurement & Verification approach
 - Follow-up and periodical revise plan



Fence to Fence - Research Initiative

- Addresses supply and demand
- Integrates and builds on past work
- Injects vision into the process
- Provides the the needed tools
- Army-wide implementation complies with new EO - improvement to ESPC process - leverage Army-wide (a bolder vision)
- Provides for front-end analysis and back-end M&V
- Installation must be stakeholder and active participant
- Create a built environment for the 21st century

